Attorney Docket No. 06618-505001
Serial No.: 09/491,353
Amendment dated December 4, 2003
Reply to Office Action dated September 5, 2003

REMARKS

Reconsideration and allowance of the above-referenced application are respectfully requested.

The references requested by the Examiner are being obtained and will be provided.

The objection based on new matter has been obviated by the amendment of claim 1. This amendment to claim 1 should also obviate the rejection under 35 USC 112, first paragraph.

Claims 25 and 26 have been canceled in order to obviate the rejections thereto.

Claims 1-2, 4-5, 9-10, 12-13, 17-18 and 20-21 stand rejected under 35 USC 103 as allegedly being unpatentable over Groothuis in view of Nasri. This contention has been obviated by amending each of claims 1, 9 and 17 to recite additional subject matter that obviates the rejection. Initially, it is noted that the present invention relates to a specific technique for use in a finite element method. All discretizations are approximations, but better discretization techniques can produce better results.

It is known how to produce control meshes which represent a model of a surface. In the one-dimensional case, it is

straightforward to smooth a control mesh by successive refinement and subsequent averaging. However, in the two-dimensional case, it becomes much more complex to smooth a control mesh from a piecewise continuous state to a more continuous, e.g. C^1-continuous state, in and especially in the presence of irregular vertices.

In order to form a smooth surface, the control mesh must be processed in a way that makes it smooth, as compared with piecewise-continuous. The present claims define a specific advantage -- that is obtained when the mathematical model to be discretized has a fourth-order differential operator. The recursively generated subdivision surfaces enable making truly smooth surfaces in two dimensions, which are used as basis or shape functions for the finite element computation. By doing this, a two-dimensional finite element analysis can be carried out.

The Buchanan reference was cited since it explains that the governing plate bending equation is a fourth-order differential equation. As Buchanan points out, "there are fundamental obstacles that cause the application of the finite element method to plate-bending problems". However, nowhere in Buchanan is there any teaching or suggestion of using smooth subdivision shape functions. Rather, Buchanan simply points out that plate

bending "has a more stringent continuity requirement", which means smooth (e.g. C^1-continuous) shape functions. Nowhere is there any teaching or suggestion of the smooth shape functions which would be needed to carry this out. However, Buchanan alternatively discusses an element "that gives good results without satisfying all continuity requirements".

For all these reasons, it is respectfully suggested that all of the claims should be in condition for allowance. A formal notice to that effect is respectfully solicited.

Please charge the one month extension of time fee and any other charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

Date: 1/5/03

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